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Optimisation of gaseous nitriding process parameters for hard surface layer of duplex stainless steel (Article)

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Abstract

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The optimisation for gaseous nitriding process parameters of duplex stainless steel was performed using Taguchi approach. The nitriding process parameters of temperature, time and gas mixture ratio of NH_3 and N_2 are considered as input parameters. Three responses are chosen which are surface hardness, wear weight loss and coefficient of friction. The optimum process parameters for surface hardness and coefficient of friction are similar with 550°C, 16 hour and 0.3 NH_3/N_2. The study revealed that temperature and time are the most significant factor influencing the responses of nitrided surface of DSS. The formation of hard surface layer contains expanded austenite with thickness layer until 135 μm and maximum hardness of 1,440 Hv. The hardness values produced five times greater than untreated DSS. The worn surface after wear test has improved with mild wear and smooth abrasion mark. Copyright © 2019 Inderscience Enterprises Ltd.

SciVal Topic Prominence

Topic: Nitriding | Austenitic stainless steel | Expanded austenite

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